

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Original) A chemically strengthened glass substrate for an information recording medium, wherein a strengthened layer formed by chemical strengthening exists on an outer edge surface and on an inner edge surface but substantially not on a surface on which an information recording layer is formed.

2. (Original) A glass substrate for an information recording medium as claimed in claim 1,

wherein, on the surface on which the information recording layer is formed, the glass substrate comprises the following glass ingredients:

40 to 75 % by weight of SiO_2 ;

3 to 20 % by weight of Al_2O_3 ;

0 to 8 % by weight, zero inclusive, of B_2O_3 ;

a total of 5 to 15 % by weight of R_2O compounds, where $\text{R} = \text{Li}, \text{Na}, \text{and K}$;

$\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{B}_2\text{O}_3$ accounting for 60 to 90 % by weight;

a total of 0 to 20 % by weight, zero inclusive, of $\text{R}'\text{O}$ compounds, where $\text{R}' = \text{Mg}, \text{Ca}, \text{Sr}, \text{Ba}, \text{and Zn}$; and

a total of 0 to 15 % by weight, zero inclusive, of $\text{TiO}_2 + \text{ZrO}_2 + \text{Ln}_x\text{O}_y$, where Ln_xO_y represents at least one compound selected from the group consisting of lanthanoid metal oxides, Y_2O_3 , Nb_2O_5 , and Ta_2O_5 , and

wherein the following condition is fulfilled:

$1.5 < \text{Al}_2\text{O}_3 / \text{B}_2\text{O}_3$, or $\text{B}_2\text{O}_3 = 0 \%$.

3. (Original) A glass substrate for an information recording medium as claimed in claim 1,

wherein the glass substrate has a specific elastic modulus E/ρ of 30 or higher.

4. (Original) A glass substrate for an information recording medium as claimed in claim 1,

wherein the glass substrate has a Vickers hardness H_v in a range of from 450 to 650.

5. (Original) A glass substrate for an information recording medium as claimed in claim 1,

wherein the glass substrate has alkali elution A of 350 ppb or lower per 2.5-inch disk.

6. (Original) A glass substrate for an information recording medium as claimed in claim 1,

wherein the glass substrate has Si elution S of 500 ppb or lower per 2.5-inch disk.

7. (Original) A glass substrate for an information recording medium as claimed in claim 1,

wherein the glass substrate has a fracture toughness K_{Ic} of 0.80 MPa / $m^{1/2}$ or greater.

8. (Original) An information recording medium comprising:

a glass substrate as claimed in claim 1; and

an information recording layer formed on at least one side surface of the glass substrate.

9. (Original) An information recording medium as claimed in claim 8, wherein, on the surface of the glass substrate on which the information recording layer is formed, the glass substrate comprises the following glass ingredients:

40 to 75 % by weight of SiO_2 ;

3 to 20 % by weight of Al_2O_3 ;

0 to 8 % by weight, zero inclusive, of B_2O_3 ;

a total of 5 to 15 % by weight of R_2O compounds, where $R = Li, Na,$ and K ;

$SiO_2 + Al_2O_3 + B_2O_3$ accounting for 60 to 90 % by weight;

a total of 0 to 20 % by weight, zero inclusive, of $R'O$ compounds, where $R' = Mg, Ca, Sr, Ba,$ and Zn ; and

a total of 0 to 15 % by weight, zero inclusive, of $TiO_2 + ZrO_2 + Ln_xO_y$, where Ln_xO_y represents at least one compound selected from the group consisting of lanthanoid metal oxides, $Y_2O_3, Nb_2O_5,$ and Ta_2O_5 , and

wherein the following condition is fulfilled:

$1.5 < Al_2O_3 / B_2O_3$, or $B_2O_3 = 0 \%$.

10. (Original) An information recording medium as claimed in claim 8, wherein the glass substrate has a specific elastic modulus E / ρ of 30 or higher.

11. (Original) An information recording medium as claimed in claim 8, wherein the glass substrate has a Vickers hardness H_v in a range of from 450 to 650.

12. (Original) An information recording medium as claimed in claim 8, wherein the glass substrate has alkali elution A of 350 ppb or lower per 2.5-inch disk.

13. (Original) An information recording medium as claimed in claim 8, wherein the glass substrate has Si elution S of 500 ppb or lower per 2.5-inch disk.

14. (Original) An information recording medium as claimed in claim 8, wherein the glass substrate has a fracture toughness K_{Ic} of $0.80 \text{ MPa} / \text{m}^{1/2}$ or greater.

15. (New) A method for strengthening a glass substrate having an inner edge surface, an outer edge surface, and a recording surface comprising:

immersing the glass substrate in a chemical strengthening melt to replace ions present near the inner edge surface, the outer edge surface, and the recording surface of the glass substrate with ions having larger ion radii to form a strengthened layer; and

polishing the recording surface of the glass substrate to a depth greater than that of the strengthened layer.

16. (New) A method for strengthening a glass substrate having an inner edge surface, an outer edge surface, and a recording surface comprising:

applying a masking substance to the recording surface of the glass substrate, wherein the masking substance is not substantially applied to the inner edge surface and the outer edge surface of the glass substrate; and

immersing the glass substrate in a chemical strengthening melt in which the inner edge surface and the outer edge surface are exposed to replace ions present near the inner edge surface and the outer edge surface with ions having larger ion radii to create a strengthened layer on the inner edge surface and the outer edge surface of the glass substrate but substantially not on the recording surface of the glass substrate.

17. (New) A method for producing a chemically strengthened glass substrate for a recording medium comprising:

forming a glass substrate having a recording surface, an inner edge surface, and an outer edge surface, wherein on the recording surface, the glass substrate is comprised of the following glass ingredients:

40 to 75 % by weight of SiO_2 ;

3 to 20 % by weight of Al_2O_3 ;

0 to 8 % by weight, zero inclusive, of B_2O_3 ;

a total of 5 to 15 % by weight of R_2O compounds, where $\text{R} = \text{Li}, \text{Na}, \text{and K}$;

$\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{B}_2\text{O}_3$ accounting for 60 to 90 % by weight;

a total of 0 to 20 % by weight, zero inclusive, of $\text{R}'\text{O}$ compounds, where $\text{R}' = \text{Mg}, \text{Ca}, \text{Sr}, \text{Ba}, \text{and Zn}$; and

a total of 0 to 15 % by weight, zero inclusive, of $\text{TiO}_2 + \text{ZrO}_2 + \text{Ln}_x\text{O}_y$, where Ln_xO_y represents at least one compound selected from the group consisting of lanthanoid metal oxides, Y_2O_3 , Nb_2O_5 , and Ta_2O_5 , and

wherein the following condition is fulfilled:

$1.5 < \text{Al}_2\text{O}_3 / \text{B}_2\text{O}_3, \text{ or } \text{B}_2\text{O}_3 = 0 \%$;

immersing the glass substrate in a chemical strengthening melt to replace ions present near the inner edge surface, the outer edge surface, and the recording surface of the glass substrate with ions having larger ion radii to form a strengthened layer; and

polishing the recording surface of the glass substrate to a depth greater than that of the strengthened layer.

18. (New) A method for producing a chemically strengthened glass substrate for a recording medium comprising:

forming a glass substrate having a recording surface, an inner edge surface, and an outer edge surface, wherein on the recording surface, the glass substrate is comprised of the following glass ingredients:

40 to 75 % by weight of SiO_2 ;

3 to 20 % by weight of Al_2O_3 ;

0 to 8 % by weight, zero inclusive, of B_2O_3 ;

a total of 5 to 15 % by weight of R_2O compounds, where $\text{R} = \text{Li}, \text{Na}, \text{ and } \text{K}$;

$\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{B}_2\text{O}_3$ accounting for 60 to 90 % by weight;

a total of 0 to 20 % by weight, zero inclusive, of $\text{R}'\text{O}$ compounds, where $\text{R}' = \text{Mg}, \text{Ca}, \text{Sr}, \text{Ba}, \text{ and } \text{Zn}$; and

a total of 0 to 15 % by weight, zero inclusive, of $\text{TiO}_2 + \text{ZrO}_2 + \text{Ln}_x\text{O}_y$, where Ln_xO_y represents at least one compound selected from the group consisting of lanthanoid metal oxides, Y_2O_3 , Nb_2O_5 , and Ta_2O_5 , and

wherein the following condition is fulfilled:

$1.5 < \text{Al}_2\text{O}_3 / \text{B}_2\text{O}_3, \text{ or } \text{B}_2\text{O}_3 = 0 \%$;

applying a masking substance to the recording surface of the glass substrate, wherein the masking substance is not substantially applied to the inner edge surface and the outer edge surface of the glass substrate; and

immersing the glass substrate in a chemical strengthening melt in which the inner edge surface and the outer edge surface are exposed to replace ions present near the inner edge surface and the outer edge surface with ions having larger ion radii to create a

Application No. 10/784,447
Amendment dated January 9, 2008
Reply to Office Action of October 9, 2007

strengthened layer on the inner edge surface and the outer edge surface of the glass substrate but substantially not on the recording surface of the glass substrate.